# PROCESS OF THE BARBERRY ERADICATION CAMPAIGN IN MINNESOTA, 1918

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## INTRODUCTION

Among the plant diseases which take their annual toll from the farmers of Minnesota each year, stem rust of grains is the most destructive. In the last fourteen years the average annual loss to the Minnesota wheat crop from stem rust has been approximately 6,159,000 bushels. The oats, barley, and rye crops also have suffered severe losses.

Every available means must be utilized to reduce the losses from stem rust to a minimum. Cultural practices may help reduce losses from stem rust in some years. In addition, every effort should be made to aid in the production of rust-resistant varieties of grain. It also is of the greatest importance that every common barberry be eradicated from the State of Minnesota.

In the years from 1915 to 1921, inclusive, the approximate average annual loss of wheat in Minnesota from stem rust was 9,406,000 bushels. The barberry eradication campaign began in 1918. In the last seven years of this campaign the average annual loss in Minnesota has been 2,912,000 bushels. The average percentage loss to our wheat crop for the years 1915 to 1921, inclusive, was approximately 21 per cent. For the last seven years, during which time the most intensive work has been done on barberry eradication, the average loss has been only 11 per cent. This reduction of 10 per cent during the last seven years is, in all probability, due to elimination of the early sources of rust inoculum. Every year since the beginning of the campaign large numbers of barberries have been found and destroyed, until the total has reached 909,936 original bushes, sprouting bushes, and seedlings. The killing of all these local sources of stem rust undoubtedly has been an important factor in reducing rust losses.

The main activities of the barberry eradication campaign are carried on under the direction of the Office of Cereal Crops and Diseases, Bureau of Plant Industry, U. S. Department of Agriculture. In a campaign of this type, cooperation from all possible agencies is necessary, and in this respect Minnesota has been very fortunate. The University of Minnesota, through its plant pathology and extension departments, aids in disseminating information concerning the relation of common barberry to

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black stem rust. The State Department of Agriculture, through its weed-inspection forces, helps to find and eradicate common barberries. The State Department of Education assists in the educational campaign through the schools. The Conference for the Prevention of Grain Rust, an organization of business men of the Northwest, has been most liberal in its support.

## SURVEY ACTIVITIES

Three types of surveys have been used in finding barberries. These are the first or preliminary survey, the second survey, and the resurvey.

### First or Preliminary Survey

The first or preliminary survey was a property-to-property survey in cities, towns, and villages, and a farm-to-farm survey of all rural properties in the State. The purpose of this survey was the destruction of the largest number of bushes in the shortest possible time. Every barberry destroyed lessens the chance of stem-rust infection. Therefore, at the beginning of the eradication campaign, more emphasis was placed on destroying a large number of bushes than on getting every bush as the survey progressed. This survey has been completed in Minnesota.

Some bushes were missed on the first survey, and these are capable of doing some damage, but the chance of greater damage was reduced materially in a few years by speeding up the work and covering the whole State.

### Second Survey

The second survey is more intensive than the first. On this survey every foot of every property upon which barberries may be growing is searched. The field agents on second survey locate not only the straggling bushes missed on the first survey, but also the new bushes which have grown from seeds scattered by birds and other agencies from the planted bushes.

To find every common barberry bush even on second survey is extremely difficult. The main object of this survey is to locate the vicinities where common barberry bushes are growing and then eradicate all of the bushes found. This does not preclude the possibility of more bushes in those vicinities. That birds and other agencies have been spreading seeds for years and that these seeds may lie in the soil for several years, must be recognized. These conditions necessitate several thorough reinspections of the localities where barberries previously have been destroyed.

### Resurvey

Resurveys are reinspections of the properties on which barberries

have been found and destroyed. In Minnesota, especially in the southeastern portion, there are numerous areas of escaped barberries. Some of these were very extensive. An attempt is made to return to these at least once in five years, so that the young bushes arising from seed can be kept from developing into fruiting bushes. This is done to prevent the further production of bushes. One of our greatest problems is keeping down the production of seeds in areas which we are unable to reach with the intensive survey.

## BARBERRY ERADICATION ACTIVITIES, 1928.

The barberry eradication activities for 1928 included (1) survey, (2) stem-rust observations, and (3) educational activities. The ultimate object of the barberry eradication campaign is to find and destroy all common barberry bushes. We need to know, however, the damage that is being done by common barberry in spreading rust. To keep the common barberry under control in the future, it is necessary that every man, woman, and child know what it is and what it does. For this reason we are sending material to schools throughout the State.

### Survey

Barberries may be found growing in almost any kind of a place. In 1928, bushes and seedlings were found growing on islands in lakes, on lake shores, in woods and underbrush, in thickets of weeds, and in similar places. It was necessary to search these types of places very thoroughly.

During 1928 the second survey was conducted in LeSueur, Hennepin, and Carver Counties. Due to the number of woodlands, lake shores, etc., progress was very slow. The three townships which remained to be surveyed in LeSueur County were completed. All three of the previously named counties are in or adjacent to the wheat section of Minnesota. The following table gives the results of the second survey in 1928:

| County | No. twps. surveyed | New props. hav. bushes | Planted bushes | Escaped bushes | Seedlings | Sprout. bushes | Total of all bushes & seedl. |
|---|---|---|---|---|---|---|---|
| Carver | 7 | 18 | 17 | 370 | 470 | 27 | 884 |
| Hennepin | 6 | 77 | 503 | 2221 | 904 | 441 | 4069 |
| LeSueur | 3 | 3 | 11 | 81 | 62 | 0 | 154 |
| Totals | 16 | 98 | 531 | 2672 | 1436 | 468 | 5107 |

While from the above table it will be seen that progress is slow, yet the results indicate that only by a thorough careful search can we hope to reduce the number of barberries to a minimum.

Nicollet, Freeborn, Houston, and part of Fillmore Counties were resurveyed. In these counties only the vicinities where bushes previously had been found were surveyed. The bushes recorded in the following table were mainly small bushes which had developed from seedlings since the previous surveys:

| County | New props. hav. bushes | Planted bushes | Escaped bushes | Seed-lings | Sprout. bushes | Total of all bushes & seedl. |
|---|---|---|---|---|---|---|
| Fillmore | 10 | 1 | 1,965 | 230 | 242 | 2,438 |
| Freeborn | 3 | 0 | 83 | 7 | 11 | 101 |
| Houston | 14 | 2 | 1,115 | 1,169 | 30 | 2,316 |
| Nicollet | 0 | 0 | 187 | 22 | 36 | 245 |
| Totals | 27 | 3 | 3,350 | 1,428 | 319 | 5,100 |

In connection with resurvey, however, it is encouraging to note that very few new seedlings, which had come up during 1928, were found. This indicates that few old seeds are germinating.

## Eradication

To kill common barberry bushes when they are found is simple. Common salt applied to the base of the bush is a sure method of killing common barberry if an adequate amount of salt is used. The only bushes that were dug were those growing in gardens or near valuable trees and shrubbery.

## Stem Rust Observations

Although the stem-rust epidemic in 1928 was very light, infection was obviously heavier in some local areas. One of the most outstanding examples of this was in West Newton Township, Nicollet County. Here stem rust was found spreading from 16 common barberry bushes to oats and wheat. The spread was traced for six miles on wheat and five miles on oats. No difficulty was experienced in tracing the spread of the rust these distances. A total of 19 cases of stem rust spreading from common barberries was observed in Minnesota during 1928. This brings the total for the State up to 205 distinct rust spreads observed during the entire campaign. Instances of stem rust spreading from barberries to grain have been found in almost every grain-growing county in the State. This emphasizes the necessity of getting rid of common barberry as a crop sanitation measure. It shows clearly that if a larger number of barberries had been spreading inoculum in the State in 1928, proportionately more stem rust would have developed. Our aim is to find and destroy these sources of rust as fast as we can. The speed of eradication is obviously dependent upon the available personnel and funds.

## Educational Activities

During 1928, over 5,000 lesson plans, on the relation of common barberry to black stem rust, were distributed to rural schools, high schools, normal schools, and colleges. During the past summer, thirteen 4-H club camps were visited. At these camps the boys and girls were taught to recognize common barberry. Several new locations of barberry were found as a result of this work. In addition, demonstrations were held at several county fairs. A large demonstration was held at the State Fair. Several large plantings of barberries were reported by people whose interest was aroused by this demonstration.

Fair demonstrations in other States frequently aid us in locating bushes. This year a planting of barberry in Clay County was reported at a fair in North Dakota. On investigating this location, the remains of a hedge over 40 years old were found in Moland Township, Clay County. In addition, 21 escaped common barberry bushes were found growing along the Buffalo River. The owner and his neighbor have signed an affidavit to the effect that stem rust has always been worse on his farm than on farms five and ten miles distant. In 1925, Dr. H. L. Bolley, of the North Dakota Experiment Station, took a group of cereal pathologists to this farm and showed them a very heavy infection of stem rust on grains. At that time he stated that he came to this farm every year to find the first stem rust on grains and that he was convinced that there were barberries in the vicinity. The bushes now have been found.

One of our most extensive educational activities is in cooperation with the State Department of Agriculture, which holds meetings of all township chairmen and weed inspectors in every county of the State. The barberry-eradication problem is discussed at all of these meetings, and the weed inspectors aid greatly in keeping known locations of common barberry from producing more bushes and in finding and destroying bushes in new locations. If this activity is continued from year to year, the weed inspectors will be one of our greatest helps in finding common barberries.

## RÈSUMÈ OF WHOLE CAMPAIGN

Since 1918, 857,610 common barberry bushes and seedlings have been found and destroyed in Minnesota. The largest number of bushes have been found in southern Minnesota, but bushes have been found in every county except Cook County. Many common barberry bushes have been found and destroyed in the Red River Valley.

## FUTURE PROBLEMS

Although progress has been made toward eradication the last common barberry in Minnesota, much remains to be done. Many of the southeastern counties have not been covered by the second survey. These counties were

the first to be settled in the State and are the most difficult to survey. Many of the settlers were from New England and brought barberries with them. Bushes were brought into Houston County in 1850. As a result, escaped bushes are very numerous in southeastern Minnesota and will require a considerable amount of time to find and eradicate. This is complicated by the large amount of woods and rough hilly country.

After an intensive survey is made, a recheck of the localities where common barberry has been found is necessary about once in every five years. This tends to prevent seedlings from producing seeds and eventually will result in the clean-up of the areas of escaped bushes. To clear completely all of the areas of escaped bushes, constant watch over a period of years will be necessary. If this is not done, all previous clean-up efforts will have been wasted.

Barberry eradication is both a relief measure and a preventive measure, absolutely necessary to the protection of our future grain crops. If the common barberries were allowed to grow unhindered, producing seed and multiplying, they soon would become so numerous and destructive that grain would be attacked practically every year by local as well as general epidemics. Eternal vigilance in barberry eradication is the price of freedom from severe annual losses from black stem rust.